CLAIMS

What Is Claimed Is:

1. A method for manufacturing a thin-film battery comprising the steps of:

a. through a first mask, depositing a first metal as an adhesion layer on a substrate;

b. through said first mask, depositing a second metal as a current collector over said adhesion layer;

c. through said first mask, sputtering a cathode layer in an argon-oxide gas on top of said current collector while rocking said substrate in an oscillatory fashion;

d. heating said substrate in a dry environment of less than 1% humidity to an elevated temperature for a fixed period of time;

e. through a second mask, sputtering a thin film solid state electrolyte material onto said current collector layer while rocking said substrate in an oscillatory fashion, thereby forming an electrolyte layer;

f. evaporating an anode layer over said electrolyte layer; and

g. packaging and sealing the resulting structure.

2. The method as in Claim 1 wherein said first metal is cobalt.

3. The method as in Claim 1 wherein said second metal is platinum.

4. The method as in Claim 1 wherein said cathode layer is a thin film solid state material.

5. The method as in Claim 1 wherein said cathode layer is formed of $LiCoO_2$.

6. The method as in Claim 1 wherein said electrolyte layer is formed of LiPON.

7. The method as in Claim 1 wherein said step of sealing includes applying a bead of epoxy around said thin-film battery in a dry environment and placing a plate thereover.

8. The method as in Claim 7 wherein said plate is glass.

9. The method as Claim 1 wherein said substrate is silicon having an insulating layer thereover.

10. The method as in Claim 1 wherein said substrate is glass.

11. The method as in Claim 1 where in step d thereof said elevated temperature is 300°C and said fixed time is 30 minutes.

12. The method as in Claim 1 where in step c thereof said step of rocking includes rocking the substrate back and forth beneath the target with an amplitude of 5 centimeters.

13. The method as in Claim 1 where step c thereof further includes the ratio of argon to oxygen gas is in the ration of 3 to 1.

14. The method as in Claim 1 where step c thereof further includes the step of holding said substrate 70 millimeters away from the target.

15. The method as in Claim 1 further including after step c, said substrate is maintained in a dry environment of less than 1% humidity while performing an X-ray diffraction on said deposited layers to insure that said current collector layer contains nano-crystalline $LiCoO_2$ grains oriented with their (104) planes parallel to the plane of said substrate.

16. The method as in Claim 1 where in step e thereof said electrolyte layer is deposited in a sputter chamber in the presence of pure N_2 holding said substrate 90 millimeters from the target using 100 Watts of power.

17. The method as in Claim 1 where in step e thereof said electrolyte is deposited to a thickness of 1 to 1.5 microns.

18. The method as in Claim 1 where in step e thereof further includes rocking said substrate back and

forth beneath the target with an amplitude of 5 centimeters.

19. The method as in Claim 1 further including removing with HCL said portions of said cathode layer left exposed after depositing said second composition of lithium and cleaning thereafter for ohmic contact with circuitry employing said thin-film battery.

20. A thin-film battery structure comprising:

a. an adhesion layer of cobalt deposited on a substrate;

b. a current collector layer of platinum deposited over said adhesion layer;

c. a cathode layer sputtered over said adhesion layer and current collector layer, which layer is formed of a thin-film solid state material;

d. a lithium based solid state electrolyte layer sputtered from over said cathode layer;

e. a lithium metal anode formed over said electrolyte layer by the use of an appropriate shadow mask;

f. a first electrode formed by exposing a part of said anode layer for connection to external circuitry;

g. a second electrode formed by exposing a part of said cathode layer for connection to external circuitry; and,

h. a package sealing and protecting said structure.

21. A method for manufacturing a thin-film battery comprising the steps of:

a. through a first mask, depositing cobalt as an adhesion layer on a substrate;

b. through said first mask, depositing platinum as a current collector layer over said adhesion layer;

c. through said first mask, sputtering $LiCoO_2$ in a 3:1 argon-oxide gas on top of said current collector layer while rocking said substrate under the target in an oscillatory fashion;

h. heating said substrate in a dry environment of less than 1% humidity to 300°C for thirty minutes;

i. through a second mask, sputtering an electrolyte material of LiPON onto said current collector layer while rocking said substrate in an oscillatory fashion, thereby forming an electrolyte layer;

j. evaporating lithium metal anodes using an appropriate shadow mask; and,

k. packaging and sealing the resulting structure.